

Main Roads Specification

MRS93

Traffic Signals

June 09

IMPORTANT INFORMATION

The requirements of this document represent Technical Policy of the department and contain Technical Standards. Compliance with the department's Technical Standards is mandatory for all applications for the design, construction, maintenance and operation of road transport infrastructure in Queensland by or on behalf of the State of Queensland.

This document will be reviewed from time to time as the need arises and in response to improvement suggestions by users. Please send your comments and suggestions to the feedback email given below.

FEEDBACK

Your feedback is welcomed. Please send to mr.techdocs@tmr.qld.gov.au.

COPYRIGHT

© State of Queensland (Department of Transport and Main Roads) 2009

Copyright protects this publication. Except for the purposes permitted by and subject to the conditions prescribed under the Copyright Act, reproduction by any means (including electronic, mechanical, photocopying, microcopying or otherwise) is prohibited without the prior written permission of the department. Enquiries regarding such permission should be directed to the Road & Delivery Performance Division, Queensland Department of Transport and Main Roads.

DISCLAIMER

This publication has been created for use in the design, construction, maintenance and operation of road transport infrastructure in Queensland by or on behalf of the State of Queensland.

Where the publication is used in other than the department's infrastructure projects, the State of Queensland and the department gives no warranties as to the completeness, accuracy or adequacy of the publication or any parts of it and accepts no responsibility or liability upon any basis whatever for anything contained in or omitted from the publication or for the consequences of the use or misuse of the publication or any parts of it.

If the publication or any part of it forms part of a written contract between the State of Queensland and a contractor, this disclaimer applies subject to the express terms of that contract.

June 09

Table of Contents

	Page
1 INTRODUCTION.....	1
2 MEASUREMENT OF WORKS.....	1
2.1 Standard Work Items	1
2.2 Work Operations	2
2.3 Method of Measurement of Traffic Signal Components	8
2.4 Removal of Existing Equipment.....	9

Traffic Signals

1 INTRODUCTION

This Specification applies to the supply and installation of traffic signals hardware, associated control equipment and cabling.

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications* and other specifications as appropriate.

This Specification forms part of the Main Roads Specifications and Technical Standards Manual.

2 MEASUREMENT OF WORKS

2.1 Standard Work Items

In accordance with the provisions of Clause 2 of MRS01 *Introduction to Specifications and Technical Standards*, the standard work items covered by this Specification are listed in Table 2.1.

Table 2.1 - Standard Work Items

Standard Item No.	Description	Unit of Measurement
Traffic Signal Equipment		
6611	Supply of traffic signal equipment, [<i>description</i>].	lump sum
6612	Installation of traffic signal equipment, [<i>description</i>].	lump sum
6613	Supply and installation of traffic signal equipment, [<i>description</i>].	lump sum
Traffic Signal Posts and Mast Arms.		
6621	Supply of traffic signal post, [<i>length</i>] metres long, [<i>with without</i>] hinged baseplate.	each
6622	Supply of traffic signal mast arm [<i>with without</i>] road lighting luminaire spigot, with a [<i>length</i>] metre long outreach arm, [<i>with a without</i>] [<i>length</i>] mm long luminaire transition piece].	each
6623	Supply of joint use traffic signal and road lighting pole, [<i>length</i>] metres long.	each
6624	Supply of push button post, [<i>length</i>] metres long, [<i>with without</i>] hinged baseplate.	each
6631	Installation of traffic signal post, [<i>length</i>] metres long, [<i>with without</i>] hinged baseplate.	each
6632	Installation of traffic signal mast arm [<i>with without</i>] road lighting luminaire spigot, with [<i>length</i>] metres long outreach arm.	each
6633	Installation of joint use traffic signal and road lighting pole, [<i>length</i>] metres long.	each
6634	Installation of push button post, [<i>length</i>] metres long, [<i>with without</i>] hinged baseplate.	each
6635	Supply and installation of traffic signal post, [<i>length</i>] metres long, [<i>with without</i>] hinged baseplate.	each
6636	Supply and installation of traffic signal mast arm [<i>with without</i>] road lighting luminaire spigot, with [<i>length</i>] metres long outreach arm, [<i>with without</i>] [<i>length</i>] mm long luminaire transition piece].	each
6637	Supply and installation of joint use traffic signal and road lighting pole, [<i>length</i>] metres long.	each

Standard Item No.	Description	Unit of Measurement
6638	Supply and installation of push button post, [<i>length</i>] metres long, [<i>with / without</i>] hinged baseplate.	each
	Traffic Signal Lanterns	
6641	Supply of traffic signal lantern, [<i>LED / QH</i>], [<i>number of aspects</i>] aspect, [<i>diameter</i>] mm aspect diameter.	each
6642	Supply of pedestrian lantern, [<i>LED / QH</i>].	each
6643	Supply of target board, [<i>single / double</i>].	each
6644	Installation of [<i>overhead mounted / ground mounted</i>] traffic signal lantern, [<i>number of aspects</i>] aspect, [<i>diameter</i>] mm aspect diameter.	each
6645	Installation of pedestrian lantern.	each
6646	Installation of target board, [<i>single / double</i>].	each
6647	Supply and installation of [<i>overhead mounted / ground mounted</i>] traffic signal lantern, [<i>LED / QH</i>], [<i>number of aspects</i>] aspect, [<i>diameter</i>] mm aspect diameter, and [<i>single / double</i>] target board.	each
6648	Supply and installation of pedestrian lantern, [<i>LED / QH</i>].	each
	Pedestrian Push Buttons	
6651	Supply of traffic signal pedestrian push button, [<i>standard / audio-tactile</i>].	each
6652	Installation of traffic signal pedestrian push button, [<i>standard / audio-tactile</i>].	each
6653	Supply and installation of traffic signal pedestrian push button, [<i>standard / audio-tactile</i>].	each
	Detector Loops	
6661	Supply and installation of vehicle detector loops, [<i>description</i>].	lump sum
	Traffic Signal Controller	
6671	Supply of traffic signal controller.	lump sum
6672	Installation of traffic signal controller, [<i>description of traffic signal site</i>].	lump sum
6673	Supply and installation of traffic signal controller, [<i>description of traffic signal site</i>].	lump sum
6674	Modification to existing traffic signal controller, [<i>description of traffic signal site</i>],[<i>location</i>].	lump sum
6675	Supply and installation of Personality EPROM.	lump sum
6676	Commissioning and testing of Personality EPROM.	lump sum
	Removal of Existing Equipment.	
6681	Removal of traffic signal equipment for salvage, [<i>description</i>].	lump sum
6682	Removal of traffic signal equipment for disposal, [<i>description</i>].	lump sum

2.2 Work Operations

Item 6611 Supply of traffic signal equipment, [*description*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and fabrication of all traffic signal equipment listed in Clause 1 of Annexure MRS93.1.

Item 6612 Installation of traffic signal equipment, [description].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Installation and testing of all traffic signal equipment listed in Clause 1 of Annexure MRS93.1; and
- c) Supply and installation of all cable, connectors, lugs, bolts, nuts, washers and other sundry items not specifically included above but necessary for the satisfactory performance of the installation.

Item 6613 Supply and installation of traffic signal equipment, [description].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and installation of all traffic signal equipment listed in Clause 1 of Annexure MRS93.1; and
- c) Supply and installation of all cable, connectors, lugs, bolts, nuts, washers and other sundry items not specifically included above but necessary for the satisfactory performance of the installation.

Item 6621 Supply of traffic signal post, [length] metres long, [with / without] hinged baseplate.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and fabrication of traffic signal post;
- c) Supply of finial cap and terminal assembly;
- d) Supply of hinged base plate, if applicable;
- e) Supply of upper and lower mounting brackets; and
- f) Supply of all fixing bolts, nuts and washers.

Item 6622 Supply of traffic signal mast arm [with / without] road lighting luminaire spigot, with a [length] metre long outreach arm, [with a [length] mm long luminaire transition piece].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and fabrication of traffic signal mast arm column including road lighting luminaire spigot and cap, if applicable;
- c) Supply and fabrication of mast arm outreach including lantern mounting bracket, finial end cap, if necessary, and terminal assembly;
- d) For a mast arm which includes a road lighting installation, supply and installation of luminaire transition piece; and
- e) Supply of all fixing bolts, nuts and washers.

Item 6623 Supply of joint use traffic signal and road lighting pole, [length] metres long.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and fabrication of pole; and
- c) Supply of all fixing bolts, nuts and washers.

Item 6624 Supply of push button post, [length] metres long, [with / without] hinged baseplate.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and fabrication of push button post;
- c) Supply of hinged base plate, if applicable; and
- d) Supply of all fixing bolts, nuts and washers.

Item 6631 Installation of traffic signal post, [*length*] metres long, [*with / without*] hinged baseplate.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Installation of traffic signal post on footing; and
- c) Installation of finial cap, terminal assembly and mounting brackets.

Item 6632 Installation of traffic signal mast arm [*with / without*] road lighting luminaire spigot, with [*length*] metres long outreach arm.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Assembly of traffic signal mast arm column and outreach arm;
- c) Installation of traffic signal mast arm column on footing;
- d) Setting rake of mast arm;
- e) Mortar grouting of base plate;
- f) Supply and installation of traffic signal junction box and terminal panel;
- g) Supply, installation and termination of traffic signal lantern cable from traffic signal junction box; and
- h) For a mast arm which includes a road lighting installation –
 - i) Supply and installation of luminaire transition piece;
 - ii) Supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting fused junction box in pit; and
 - iii) Testing of road lighting installation.

Item 6633 Installation of joint use traffic signal and road lighting pole, [*length*] metres long.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Installation of pole on footing;
- c) Mortar grouting of base plate;
- d) Supply and installation of traffic signal terminal panel and road lighting terminal panel;
- e) Supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting junction box in pit; and
- f) Testing of road lighting installation.

Item 6634 Installation of push button post, [*length*] metres long, [*with / without*] hinged baseplate.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Installation of push button post on footing.

Item 6635 Supply and installation of traffic signal post, [*length*] metres long, [*with / without*] hinged baseplate.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Supply, fabrication and installation of traffic signal post on footing, finial cap, terminal assembly, upper and lower mounting brackets, hinged base plate, if applicable and all fixing bolts, nuts and washers.

Item 6636 Supply and installation of traffic signal mast arm [*with / without*] road lighting luminaire spigot, with [*length*] metres long outreach arm, [*with [length] mm long luminaire transition piece*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply, fabrication and installation of traffic signal mast arm column including road lighting luminaire spigot and cap if applicable;
- c) Supply, fabrication and installation of mast arm outreach including lantern mounting bracket, finial and terminal assembly;
- d) Setting rake of mast arm;
- e) Mortar grouting of base plate;
- f) Supply and installation of traffic signal junction box and terminal panel;
- g) Supply, installation and termination of traffic signal lantern cable from traffic signal junction box; and
- h) For a mast arm which includes a road lighting installation –
 - i) Supply and installation of luminaire transition piece;
 - ii) Supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting fused junction box in pit;
 - iii) Testing of road lighting installation; and
 - iv) Supply and installation of all fixing bolts, nuts and washers.

Item 6637 Supply and installation of joint use traffic signal and road lighting pole, [*length*] metres long.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply, fabrication and installation of pole,
- c) Mortar grouting of base plate;
- d) Supply and installation of traffic signal terminal panel and road lighting terminal panel;
- e) Supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting junction box in pit;
- f) Supply of all fixing bolts, nuts and washers; and
- g) Testing of road lighting installation.

Item 6638 Supply and installation of push button post, [*length*] metres long, [*with / without*] hinged baseplate.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Supply, fabrication and installation of push button post, hinged base plate if applicable and all fixing bolts, nuts and washers.

Item 6641 Supply of traffic signal lantern, [*LED / QH*], [*number of aspects*] aspect, [*diameter*] mm aspect diameter.

Item 6642 Supply of pedestrian lantern [*LED / QH*].

Work Operations incorporated in the above items include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Supply of lantern including mounting straps and all accessories and fixings.

Item 6643 Supply of target board, [*single / double*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Supply of target board including all accessories and fixings.

Item 6644 Installation of [*overhead mounted / ground mounted*] traffic signal lantern, [*number of aspects*] aspect, [*diameter*] mm aspect diameter.

Item 6645 Installation of pedestrian lantern.

Work Operations incorporated in the above items include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Installation of lantern, including mounting straps and all accessories and fixings;
- c) Supply, installation and termination of lantern cable to appropriate terminal assembly; and
- d) Aiming of lantern.

Item 6646 Installation of target board, [*single / double*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Installation of target board including all accessories and fixings.

Item 6647 Supply and installation of [*overhead mounted / ground mounted*] traffic signal lantern, [*LED / QH*], [*number of aspects*] aspect, [*diameter*] mm aspect diameter, and [*single / double*] target board.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and installation of lantern including mounting straps and all accessories and fixings;
- c) Supply and installation of target board including all accessories and fixings;
- d) Supply, installation and termination of lantern cable to appropriate terminal assembly; and
- e) Aiming of lanterns.

Item 6648 Supply and installation of pedestrian lantern, [*LED / QH*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and installation of lantern including mounting straps and all accessories and fixings;
- c) Installation and termination of lantern cable to appropriate terminal assembly; and
- d) Aiming of lantern.

Item 6651 Supply of traffic signal pedestrian push button, [*standard / audio-tactile*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply of pedestrian push button including fixings; and
- c) Supply of audio-tactile driver unit, if applicable.

Item 6652 Installation of traffic signal pedestrian push button, [*standard / audio-tactile*].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Installation of pedestrian push button;

- c) Installation of audio-tactile driver unit, if applicable; and
- d) Supply, installation and termination of cables to appropriate terminal assembly.

Item 6653 Supply and installation of traffic signal pedestrian push button, [standard | audio-tactile].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply and installation of pedestrian push button;
- c) Supply and installation of audio-tactile driver unit, if applicable; and
- d) Supply, installation and termination of cables to appropriate terminal assembly

Item 6661 Supply and installation of vehicle detector loops [description].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply of loop wire and conduit;
- c) Supply of epoxy jointing kit, emulsion and sand;
- d) Cutting of slot;
- e) Installation of conduit to pit;
- f) Installation of loop cable;
- g) Filling of slot; and
- h) Jointing of loop cable to detector feed cable.

Item 6671 Supply of traffic signal controller.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
- b) Supply of traffic signal controller complete with all necessary components including internal wiring.

Item 6672 Installation of traffic signal controller, [description of traffic signal site].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Mounting of controller on base;
- c) Earthing of installation including supply of materials; and
- d) Testing of traffic electrical installation.

Item 6673 Supply and installation of traffic signal controller, [description of traffic signal site].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Supply of traffic signal controller complete with all necessary components including internal wiring;
- c) Mounting of controller on base;
- d) Earthing of installation including supply of materials; and
- e) Testing of electrical installation.

Item 6674 Modification to existing traffic signal controller, [description of traffic signal site],[location].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
- b) Installation of additional components, as listed in Clause 2 of Annexure MRTS93.1; and

- c) Testing of electrical installation.

Item 6675 Supply and installation of Personality EPROM.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*; and
b) Supply and installation of personality EPROM.

Item 6676 Commissioning and testing of Personality EPROM.

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
b) Testing the operation of the controller, all vehicle detectors and pedestrian detectors with the lamp circuits off;
c) Testing the operation of all signal groups with lamp circuits on; and
d) Verifying time settings, phasing and sequencing of phasing.

Item 6681 Removal of traffic signal equipment for salvage, [description].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
b) De-energisation of circuits;
c) Disconnection of cables;
d) Dismantling and removal of components, as appropriate; and
e) Transport of all components to the Principal's storage facility or designated site storage area for reuse.

Item 6682 Removal of traffic signal equipment for disposal, [description].

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*;
b) De-energisation of circuits;
c) Disconnection of cables;
d) Demolishing of components; and
e) Disposal of demolished materials.

2.3 Method of Measurement of Traffic Signal Components

This specification provides Standard Work Items for –

- a) supply only of individual components;
b) installation only of individual components;
c) supply and installation of individual components; and
d) supply and installation of complete traffic signal sites on a lump sum basis.

Any combination of Standard Work Items relating to these methods of measurement may be used in the Schedule of Rates. However –

- a) where a Standard Work Item for supply and installation of a particular component or group of components is included in the Schedule of Rates, no supply only nor installation only Standard Work Item shall also apply to that component or group of components, as applicable; and
b) where a Standard Work Item for supply and installation of a complete traffic signal site on a lump sum basis is included in the Schedule of Rates, no supply only, installation only nor supply and installation Standard Work Item shall also apply to that work.

2.4 *Removal of Existing Equipment*

The Superintendent will inspect the salvaged materials at the storage site and will reject any materials which, in the opinion of the Superintendent, have been damaged during the salvage operation. The Contractor shall be required to reimburse the Principal for materials damaged during salvage.